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ABSTRACT

This volume presents background information on the project and explains the needs and decisions that actuated its implementation. First year activities and some preliminary teaching material on the concept of PPB (planning-programing- budgeting) in education are also described. The major focus is on a description of the proposed system, a clarification of the major concepts and activities, and an introduction to some detailed procedural decisions to be made during the remainder of the project. A related document is EA 003 762. (Author/RA)

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Volume 1

STEP

SYSTEM FOR TRENTON'S EDUCATIONAL PLANNING

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SYSTEM FOR TRENTON'S EDUCATIONAL PLANNING (STEP)

YEAR 1 FINAL REPORT

Submitted to:

THE BOARD OF EDUCATION OF THE TRENTON PUBLIC SCHOOLS

By:

Government Studies and Systems, Incorporated
University City Science Center
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STEP FINAL REPORT

YEAR 1

VOLUME I

GENERAL DESIGN REPORT

EDMOND H. WEISS
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INTRODUCTION TO THE FINAL REPORT

These three volumes comprise the final report for the first year of an ESEA Title III project in the Trenton Public Schools, "Building a Comprehensive Planning Capability through the Use of an Educational-Planning-Programming-Budgeting System." The acronym for the system being developed is STEP -- System for Trenton's Educational Planning.

The first volume of the report contains information on the background of the project and some of the needs and decisions which led to its implementation. Volume I also includes a description of Year 1 Activities and some preliminary teaching material on the concepts of PPB in education. The major part of Volume I is devoted to a description of the proposed system, clarification of the major concepts and activities in it, and an introduction to some of the detailed procedural decisions that will be made in the remaining years of the project.

Volume II of the report is concerned with a procedure for setting the district-wide goals and objectives that will be used in STEP planning. This volume, one of the two specified "deliverables" of the performance contract between Trenton Public Schools and Government Studies and Systems, Inc., contains the analysis of the Trenton Community Opinion Survey, conducted in March and April of 1971.

The third volume, An Enrollment Forecaster, is the second of the two project "deliverables." In it is described an automated procedure for multi-year enrollment forecasting in the Trenton Public Schools. The enrollment forecasts generated by the forecaster will provide estimates of enrollments in

each of the instructional programs of the district (which are described in Volume I). Data required to operate the forecaster will be collected in Year 2 of the project.

In sum, this final report reflects a substantial part of the work performed by Government Studies and Systems under contract to the Trenton Public Schools; it does not reflect all the work, because many design activities begun in Year 1 will not be ready for presentation until Year 2 of the project. We hope that those readers only slightly familiar with PPB in education will be enlightened by the report, and that the system proposed will, in the judgment of the Trenton educational community, address the felt needs that led to the creation of the project.

BACKGROUND AND ACTIVITIES OF THE PROJECT

BACKGROUND AND ACTIVITIES OF THE PROJECT

In the spring of 1970, several influences coalesced to underscore the need for a sophisticated planning system in the Trenton Public Schools. Persons within the TPS organization, as well as persons from other civic and educational agencies which serve the Trenton community, agreed that, despite the many strengths of the district, it lacked a "comprehensive systems planning instrument for making policy decisions and allocating resources," that there was a need for a "meaningful" approach to involving organizations, parents, students, and teachers "in the making and implementation of decisions regarding educational priorities," and that there was a need to organize the administration of this effort into a well-defined and adequately funded Office of Planning within the administration.

The task force formed to analyze the need and develop a proposal, which consisted of representatives of TPS, the State Department of Education, Model Cities and other Community Agencies, as well as consulting firms which specialized in educational planning, developed specifications for the kind of system the district wanted. To summarize these "specs," it was decided that the final system would provide the Board and Executive Staff with the ability to:

1. Test the educational impact of various allocations of resources to continuing and new projects;

2. Develop plans that are directly related to educational activities;

3. Translate the plans into budgets, strongly supported by realistic estimates of the probable educational impact; and

4. Plan far enough into the future (five years) to achieve the program continuity needed to cope successfully with the educational problems of the district.

After considering various approaches to these goals, and after reviewing the credentials and proposals of several possible consultant-contractors, the Trenton Public Schools decided to employ Government Studies and Systems, Inc. as its system design group. The staff of GSS had recently completed the design and installation of a planning system in nearby Pennsbury, Pa., and TPS agreed that the Pennsbury model (EPPBS) would provide a reasonable starting point for the design of the Trenton Planning System, a system that would satisfy the specific needs of the Trenton community. To this end, GSS and TPS entered into a guaranteed performance agreement, wherein in each of the three years of the project, a portion of GSS payment was contingent on the delivery of specific system components - with a fully operational system as the Year 3 target.

The project was administered by TPS' Dr. David Weischadle, and a steering committee from the TPS administrative staff. In addition, a Technical Task Force was created, composed of representatives from TPS, government, community agencies, teacher organizations, and other interested persons; the mission of the Task Force was to review design alternatives and make recommendations to TPS and design consultants.

The system design activities during the first year were mainly concerned with the development of a goal-setting procedure, and a multi-year enrollment forecaster. In addition, activities began in Year 1 to design the information system needed to support STEP, a revenue forecaster, a cost- and resource-requirements forecaster, a project design and evaluation module, and cost-benefit decision-making procedures. The goal-setting and enrollment forecasting elements are described in Volume II and III of this final report, and the other elements are introduced and discussed more briefly in Volume I. (The Year II final report will include user procedures and computer programs for all the system elements.)

In addition to these design activities, GSS also assisted TPS in developing community involvement procedures, agency participation procedures, and in-service training activities. (See Table I-1).

TABLE I-1. SUMMARY OF GOVERNMENT STUDIES AND SYSTEMS ACTIVITIES

1. Develop Procedures for Community Involvement
   a. Design model for citizen participation
   b. Design community opinion study
   c. Process and Analyze data from community study
2. Form an Agency Task Force
   a. Define roles and activities for Technical Task Force
   b. Participate in Task Force meetings
3. Orient, Brief, and Train Staff
   a. Conduct orientations for Technical Task Force
   b. Conduct training for Central Office Staff
   c. Conduct training for Secondary administrators and Dept. chairmen
   d. Conduct training for Elementary administrators
   e. Develop briefing materials for Board of Education
   f. Provide instructional material for the teaching staff
4. Design System Components
   a. Design Goal-Setting Sub-system
   b. Design Enrollment Forecasting Model and Procedures
   c. Initiate Revenue-forecaster Design
   d. Initiate Cost (Manpower - Resources) Forecaster
   e. Initiate Planning Information System Design
   f. Develop proposed Program Structure, Indicators, Goals, and Objectives
   g. Initiate design of Evaluation-Monitoring Sub-system
   h. Initiate design of project design and cost-benefit analysis procedures.

All the objectives specified in the Title III proposal for Year 1 have been met - with the exceptions noted in the next paragraph. This success was

realized despite a funding delay which postponed the project start from July, 1970 to November, 1970.

Those objectives not met relate to orientation for the Board of Education and the teaching staff of TPS. Several priority demands on the time of both groups severely constrained the opportunities for orientation and training. These activities, however, will be re-located into Year 2 of the project, and this delay will in no way impede accomplishing the Year 3 goal.

Thus, in the fifteen months that elapsed between the first drafts of the Title III proposal and this Year I final report, the Trenton Public Schools have made dramatic progress toward their ambitious goals. In so doing, they have consolidated and exploited research and development activities of PPB projects in many other school districts, thereby realizing considerable savings on the cost of the project. They are also clearly on the road to providing an exemplary model for other school districts in New Jersey and elsewhere. This progress has been made despite the observation by Harry Hartley (at a recent conference of educational PPPS users) that, "Trying to install PPBS in a school district is like trying to change a flat tire on a moving car."

PLANNING-PROGRAMMING-BUDGETING SYSTEMS:

PRELIMINARY CONCEPTS

PPBS: PRELIMINARY CONCEPTS

WHAT PPB IS NOT

Even in the short time (about 5-7 years) that PPBS has been discussed and applied by educators, there have emerged numerous confusions between it and other educational innovations. Before we explain the elements of PPBS, we should clarify some things which PPBS is not.

1. PPBS is not <u>one</u> system or approach. It is a set of concepts -- an analytical discipline -- which can be manifested in thousands of varieties of school planning and decision-making. Indeed, some observers have noted that there is a little PPB in every good budget, even if the budget-developers never heard the term.

2. PPBS is not a <u>computerized</u> approach to planning. There is no activity required in PPBS which could not be done manually by the planners and their staffs. However, thorough PPBS planning requires a great deal of data and thousands of calculations, so that the computer is an extremely valuable computational and data management aid. (A small school district could, conceivably, do PPBS without computers, but the Trenton Public Schools would find it infeasibly cumbersome.) Further, a school district, if it is choosing its own computer system, should not choose the system primarily on the basis of its PPBS requirements. In those districts where computer needs can be satisfied with a modest computer configuration, it is pointless to install a large configuration to perform PPB computations - most of which take place within about 3-4 weeks of the year, and can be run economically by a computer service company.

3. PPBS is not an information system. An information system, or management information system, is used in PPBS, and the better the district's information handling capability, the easier to do PPBS. Note, however, that PPBS requires only a small portion of the data that a district routinely requires to manage and operate itself.

4. PPBS is not a management system. PPBS, as we will explain below, is a planning concept, not a management approach. PPBS planners are not concerned with the day-to-day operation of programs, or the week-to-week collection of data. PPBS has a multi-year perspective, and generally abstracts from the minutiae of school operation. Of course, a district's long-range planning has important implications for its short-term management, but, to repeat, PPBS is <u>not</u> a management system.

5. PPBS is not an accounting system. Perhaps the greatest confusion about PPBS has been its association with novel accounting procedures, a confusion that has been somewhat intensified by the participation of several major accounting firms in PPBS projects. Accounting is a management-control function, of only marginal importance to long-range planning. PPBS <u>does</u> employ innovative budget formats and cost analyses, and these are facilitated by having a program accounting system, but the connection is not obligatory. Most districts who claim to use PPBS, in fact, have program accounting systems.

   Closely related to this confusion is the belief that PPBS is merely a new way of presenting the budget - in program accounts, rather than functional accounts. It is true that one of the important components in PPBS is a program-budget, but PPBS is more concerned with the process of developing and evaluating the program budget than with

the document itself. Again, many school districts present their budgets in program format, but they do not employ a planning-programming-budgeting system. It is acceptable to use "program-budgeting" as a synonym for PPBS, provided one is referring to the budgeting process rather than the budget itself.

6. PPBS is not just the use of measurable goals and objectives in educational planning. Although this is usually a requisite for PPBS, a district should not delude itself that having such objectives is more than a part of the program-budgeting process.

7. PPBS is not a system for cost analysis or cost control. Though PPBS planners may employ numerous economic and management science techniques to analyze the cost of past and future programs, or, indeed, apply certain cost-reducing methods to educational programs, these activities are not, in themselves, PPBS. PPBS is concerned with cost-utility analysis, the relating of costs to desired outcomes, not just costs alone.

8. PPBS is not a replacement for existing business and accounting activities. As we will see below, PPBS serves a function different from those of the business and accounting activities of the district. PPBS is relatively useless as a means of seeing that purchases are made correctly and paid for appropriately; nor can it be used to issue payroll checks or perform other business functions. PPBS gives a district a capability it never had before, but does not necessarily replace any existing cluster of activities.

This inventory of confusions and disclaimers leads us logically to ask what PPBS is, how it evolved, and what special needs it serves.

PPBS: WHAT IT IS

A planning-programming-budgeting-system (PPBS) is a set of procedures for strategic planning. In a school district, strategic planning is the process of deciding on the multi-year goals and objectives of the district, assigning priorities to the various goals and objectives, evaluating alternative ways of achieving those goals and objectives (each with different costs and probable effects), and selecting that course of action which achieves the objectives in the least costly way. Thus, PPBS relates what is spent to what is accomplished, resource inputs to educational outputs. The PPBS analyst, once he has developed a cost-effective plan, can increase output only by increasing input (money), and he can cut costs only by cutting the expected output of the district. In a sense, PPBS shows the Board and taxpayers what the community is getting for its monies, rather than what it is spending.

The users of STEP will be investors of the public's money, rather than spenders. Each dollar committed will produce some return -- in this case, a change on the district's Indicators of Quality. (Those changes of expenditure caused by inflation will, of course, produce no change in return; "inflation" may be defined in this way.) The Board, moreover, will be able to choose among alternative budgets, each with different expected return as well as different costs.

The important theme that unites this description is the relationship between money and educational effectiveness. The most important difference between STEP planning and the many varieties of planning that now exist in TPS is that long-range educational and financial planning will be part of the same process. At present, several factors militate against this unified process:

1. Educational and financial experts are relatively ignorant of each other's disciplines and needs.

2. Except for some Federal projects, there is no multi-year planning.

3. There are no specific goals in the district, and no clear criteria for evaluating the district or its programs. Thus, both educational and financial decisions are "evaluation-proof."

4. The current budgeting format -- the "Handbook II Chart of Accounts" is nearly useless in making resource allocation decisions.

This last point cannot be overemphasized. J. Alan Thomas makes the point succinctly when he says:

> "These categories [the Handbook II accounts] are useful for descriptive purposes. However, they do not constitute useful breakdowns for the purpose of decision-making, since there is no way of relating the various inputs included in these categories to either programs or performance objectives. In fact, they may impede decision-making, by engaging boards and administrators in the partially irrelevant exercise of examining the manner in which resources are allocated among these categories. From the point of view of the school board member or layman who wishes to use the budget to inform him about the manner in which the system is allocating its resources, the ..... categories may appear to be developed for the purpose of concealing rather than revealing information."
>
> (J. Alan Thomas, The Productive School, 1971)

The obscurity of these budget accounts has engendered a peculiar style of budget decision-making in Trenton, and other, public schools. As Hartley puts it:

> "Local school budgets tend to be prepared in the 'incremental style,' which means that the primary basis for next year's budget is this year's budget. The major difference between the two is likely to be only an increase in each of

> the traditional categories of object of expenditure ... little attempt is made to evaluate the various programs, or outputs, which are presumed to be supported by the budget."
>
> (Harry Hartley, Educational Planning-Programing-Budgeting, 1968)

There is almost universal accord that the function-item budget format now used in the Trenton Public Schools is virtually useless as a planning instrument -- whatever its merits as a cost-accounting system. Indeed, one of the most innovative aspects of STEP is that the determination of the detailed function-item budget for the next school year (Year 1 in the five-year plan) is done after all the important educational and financial decisions are completed. The operating budget will follow as a necessary consequence of the approved plan, instead of the reverse, which is now often the case.

In order, therefore, to attain a strategic planning capability, TPS will require the following elements associated with Planning-Programming-Budgeting Systems:

First, a system for setting measurable performance goals for the entire district; data about the success of the district in achieving these goals will constitute an evaluation of the district's effectiveness. Decisions about where and how to invest the district's resources will be determined by an explicit statement of the goals and their priorities.

Second, a program structure which divides the district organization into its real functional components -- not those described in the current budget accounts. These components will be called programs -- and be further divided into subprograms -- and each program will be responsible for achieving some part of the district's objectives. Further, for planning purposes, moneys will be aggregated according to these programs, so that costs can be related to output on a program by program basis.

Third, a cost-benefit, or cost-utility model for making decisions, that is, a formal procedure for evaluating alternative plans before they are approved, and determining which gives the desired return at the best price.

In order to employ these elements of the planning system, several technological aids are essential:

- an information system to support planning
- an enrollment forecaster
- a revenue forecaster
- a cost and resource-requirements forecaster
- an output forecaster

Requisite Attitudes

Most descriptions of PPBS devote little space to the problem of attitude. In fact, in order for PPBS to be successful, it is essential that its users agree, as least somewhat, with the following statements:

1. The effects of education are measurable, or, more specifically, anything a school district sets out to do deliberately can be measured.
2. It is possible to separate discussions of educational ends from discussions of educational means.
3. The future, to some degree, can be "made to happen" the way we want it to.
4. The public is entitled to an explanation of the reasons behind decisions by the schools' policy makers, and, when the public believes the reasons are sound, they will support the schools.
5. The fact that there never seems to be enough money for the schools does not mean that the schools cannot be changed or improved.

STEP: GENERAL DESIGN

GENERAL DESIGN

INTRODUCTION

This section contains a description of the major clusters of activities that will occur during the planning cycle. Note that this description presumes that the developmental work is completed and the system is refined and installed. This description of what the final system includes serves two purposes:

- It explains the benefits that are not immediate, since full utilization of the system is at least two years away
- It explains the purpose of the various design activities that are now under way

In this section, and the one which follows it, we will present the overall model in increasingly greater detail; this detailing process will continue during the second year of the project and terminate in Year 2 with detailed operational definitions and user procedures for each aspect of the system.

STEP: DETAIL LEVEL I

At the highest level of abstraction the flow of elements in STEP is as follows:

Stage 1 - Assessment of current educational costs and benefits, and an updating of all those files necessary for operating the computerized elements in the planning system. The assessment is, thus, a collection of current facts, and also current ratios that will be used to generate forecasts of the future.

Stage 2 - The assessment data is fed into the "planning model," a set of computer programs which manipulate the data and produces forecasts.

Stage 3 - The generation of the base case. A five-year forecast of what the school district's costs and benefits will be, if the previous year's plan is approved without change for the present planning period.

Stage 4 - Policy deliberation. The desired levels of school district effectiveness are reviewed, to set new objectives, priorities, and constraints, or to approve those previously developed; this determination involves a community opinionnaire survey.

Stage 5 - If any changes are required by the policy deliberation, the next stage is the design of projects intended to close the gaps between the expected levels of effectiveness in the base case and the desired levels; community groups participate in the project design activities.

Stage 6 - Various combinations of new projects are run through the planning model to generate alternative plans, each with a specified anticipated cost, level of benefit, and revenue requirements.

Stage 7 - Alternative plans are considered, and the most cost-beneficial plan for achieving the district's objectives is recommended for implementation.

Stage 8 - That plan which is approved by the Board of Education becomes the approved plan. (If the policy deliberation required no changes, the base case becomes the final plan.) The detailed budget proposal for Year 1 of the plan is generated at this point. (See Figure I-1).

STEP: DETAIL LEVEL II

These broad activities can be understood only by describing their components in more detail. The paragraphs that follow describe these elements at the

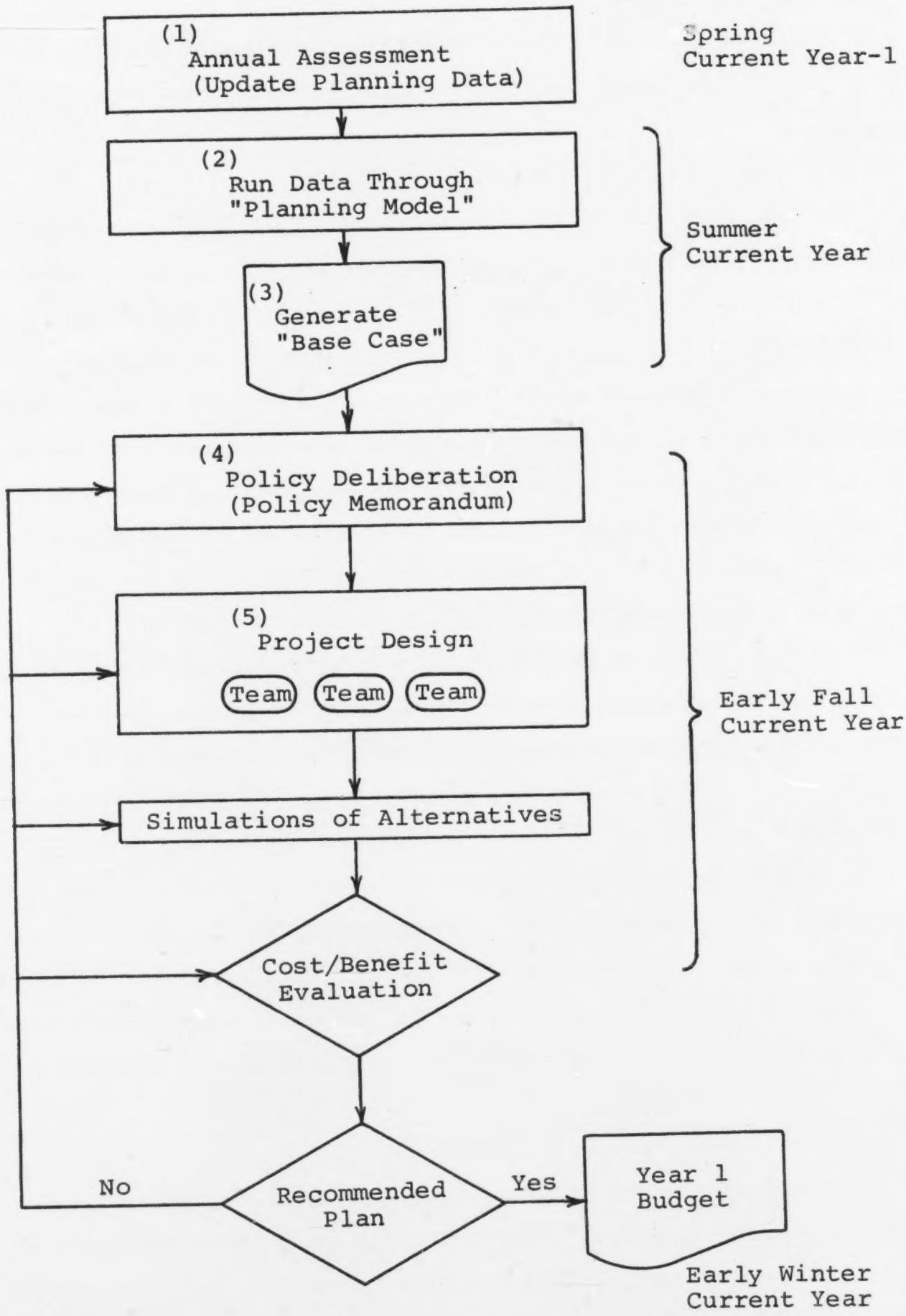

Figure I-1. Summary Flow of the Planning System

conceptual level; operational definitions (and user procedures) will be introduced later in this Volume, and detailed in the remainder of the project.

Annual Assessment

Strategic planning requires an assessment of the organization's overall behavior and effectiveness. The assessment reports facts which are important to the decision-makers and planners; in effect, the assessment is an up-dating of the planning information files, which are aggregated at broad levels. Assessment at the strategic level cannot be expected to do the job of evaluating specific projects or students. An analogous process is the general health examination, in which a small set of physiological measures are taken as a broad index of soundness, and more detailed and elaborate tests may be required if some of the broad measures suggest a problem. The analogy also extends to the fact that broad assessments and general physical examinations are most useful when they are periodic and regular; the most important insights to be gleaned from the current assessment are those measures which show a difference - either positive, negative, or neutral - from previous assessments.

Current Levels of Effectiveness

In the STEP design, effectiveness is measured by a set of 10-15 Indicators of Quality, scales used to describe the product or output of the school district as a whole. Each assessment measures the overall district on those Indicators of Quality. Selection of Indicators is a part of the system development process; candidate Indicators are recommended and explained in Volume II of this report.

Current Allocation of Resources

Current year approved expenditures are reported by program category, rather than line-item account. Within each program, costs are aggregated by Salary, Non-salary, and Capital Outlay expenditures.

The design of the program structure to be used will be completed during the remainder of the project. At present the plan is to aggregate expenditures by "Grade-Level Cluster X School". In the assessment of resource allocation will also be special project expenditures, i.e., certain activities not equivalent to one of the programs, but, for special management reasons, having a separate accounting system. (Program budgeting is described later in this Volume of the Report.)

Current Process Measures and Parametric Values

In addition to the Indicators of Quality, several other scales are used in the system, namely, those scales that describe the general relationships among the resources and people in the district. These process measures serve two purposes:

First, they characterize some process measures of quality, such as "experience of teachers", "space/student", etc.

Second, they provide the relationships needed to compute the changing costs of the educational programs, such as "class size," "expenditure/student", "administration/instruction salaries", etc.

The process measures will also be selected during the development of the system.

Current Enrollment Data

A special, critical class of process data is the enrollment of the district. In STEP, enrollment will be reported as number of students/type/program. In Trenton, overall enrollments are not changing rapidly, but student types show changing distributions.

Current Revenue Data

Included also in the assessment is a summary of the revenues currently available to the district, by source, and, where appropriate, by special purpose. The ratio of the various sources to each other is one of the process variables mentioned earlier. The STEP model will forecast Revenues in accord with the state's new "Bateman" subsidy program.

Planning Model

The planning "model" is a set of formulas and computer programs which converts one set of data into another. At this stage in STEP, the model receives the data from the assessment phase, and computes several forecasts, namely, enrollment, indicators, process measures, costs, manpower, and revenues. The planning model works on the assumption that certain ratios vary at a fixed rate (salaries), certain ratios stay the same (staff/student), and others are allowed to vary independently (total students).

The Enrollment Forecaster

The Enrollment Forecaster is described in Volume III of this Report.

Indicator Forecaster

Because the current state of educational theory has developed no scientific notion of how educational activities are related to outcomes, the prediction of future levels on the indicators of quality is necessarily subjective, involving a small group (4-5) of experienced educators (the Review Group).

Cost Forecaster

The cost forecaster expands (or contracts) costs as a function of units of service (change in enrollment), or adjusts costs in certain categories as a function of inflation factors.

Manpower Forecaster

Assuming constant staff to student ratios, the manpower forecaster projects the needed numbers of staff members, by type, as a function of enrollment changes.

Revenue Forecaster

The revenue forecaster projects the effects of enrollment change, subsidy formula, and tax base change on the total revenues available to the district, assuming no change in tax rate. Certain classes of revenues which do not vary according to predictable rules are estimated subjectively, or assumed to be zero (certain non-continuing Federal grants, for instance).

The "Base Case"

The first output of the planning model is called the "base case"; the base case is a candidate plan, showing the effects of approving last year's plan, making no changes in policy or program.

The base case is produced in three consecutive versions:

1. The five year implications of enrollment change
2. The five year implications of inflation and enrollment change.
3. The five year implications of previously approved projects (not yet implemented), and inflation, and enrollment change.

The base case is a plan - the "no change" plan. As will be shown below, it has the same elements as a new plan, but presumes no significant modification of existing programs.

Enrollments Over Time

The base case includes a print-out of the expected enrollments over time, by program and student type.

Costs/Program Over Time

The base case shows the cost implications of the current plan, as a function of inflation and enrollment change. These costs are aggregated by program and for the total district.

Indicator Measures Over Time

The estimated effects on the Indicators are printed out for the five year period.

Staff Requirements Over Time

The base case indicates the number of positions, both new and existing, that will require filling in the five-year period, as a function of both changes in overall faculty size and turnover rates.

Revenue Feasibility Over Time

For each version of the base case, the anticipated costs are compared to anticipated revenues, and the needed change in tax rate is indicated.

Gaps

The levels on the Indicators are compared to the desired levels (developed during last year's policy deliberation activities) and the gaps between the anticipated and desired levels are shown.

Policy Deliberations

The "policies" deliberated in this phase of the process relate only to those affecting planning. The most significant policy decision is to decide what the Indicators of Quality will be, and what desired levels will be pursued by the organization. Other important policies relate to limits on the process relations and parametric ratios, such as class size, salaries, etc.

The annual policy deliberation is, in fact, a review of last year's policy deliberation, to determine what, if any, changes should be adopted in the policy variables. Consequently, the planning process, while sustained over a multi-year period, is flexible and responsive to changing environments and new perspectives - as well as changes in the state-of-the-art of instructional practices.

Goals and Objectives

The choice of Indicators is, in itself, a determination of possible goals. The problem of educational goal-setting is not so much a matter of deciding what ends are worthwhile, but, rather, choosing from among the wide range of desirable ends those that most characterize the administrative philosophy of the district. The goals of the district are simply to improve with respect to the Indicators of Quality; the objectives are to improve some specific amount, in a specific time period.

Figure I-2 is an illustration of the Indicator-Objective relationship, for the Indicator: "Percent of students reading at or above grade level." (The numbers in this illustration are fictitious.)

In STEP, an important element of the goal-setting process is an annual community survey which serves as a significant input to the Board and Administration. (This process is discussed more extensively in Volume II.)

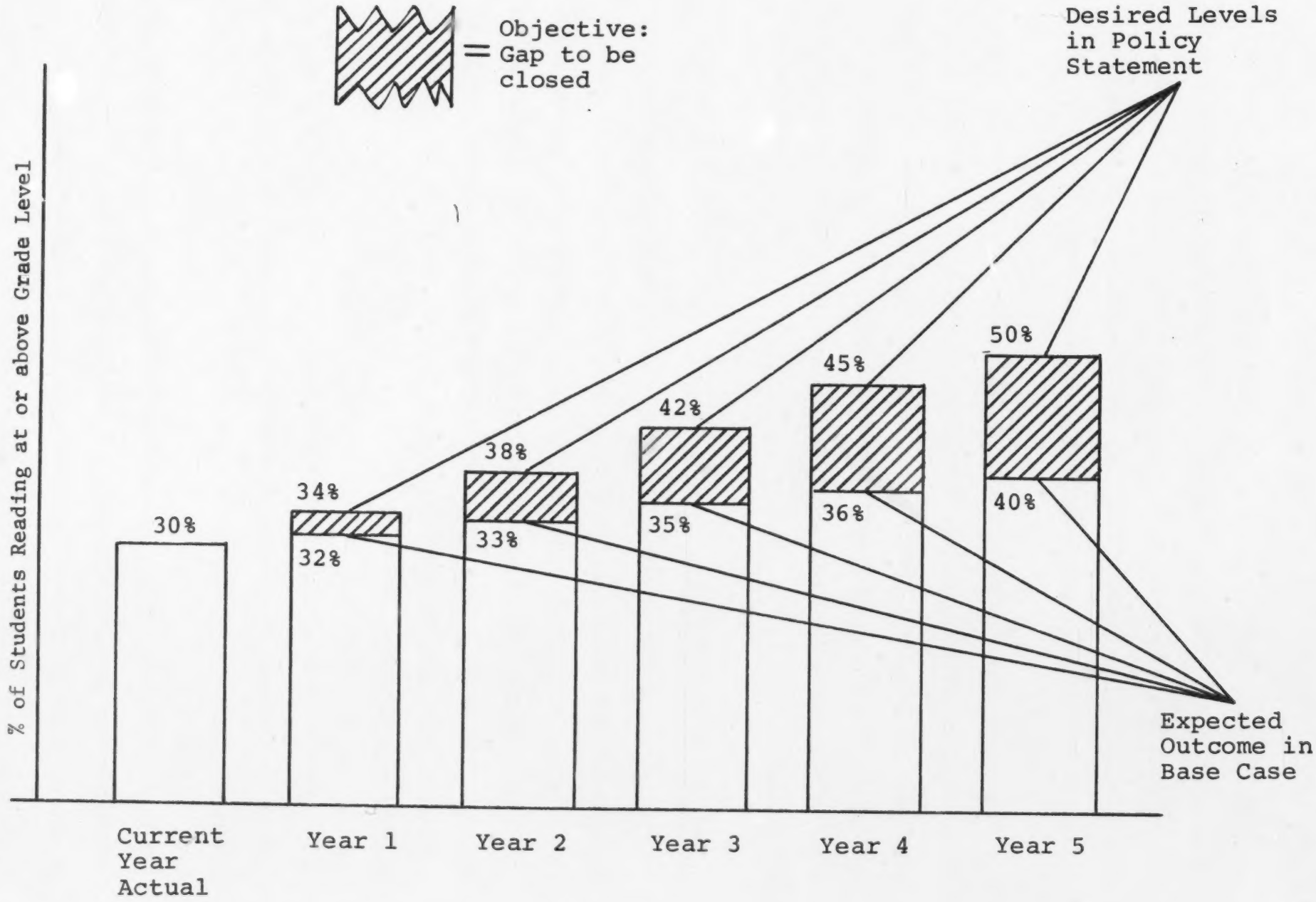

Figure I-2. Example of Indicator-Objective Relationship

Priorities

"Priority" is a measure of relative importance among the several objectives of the district. It can be expressed in at least three ways:

- a rough grouping of all objectives into high-, med-, or low-priority
- a ranking of all objectives from most to least important
- a specific weighting of the relative importance of each objective, or of the units in each scale (e.g. 1% decrease in "Drop-out" is twice as desirable as 1% increase in "Reading at or above grade level")

Statements of priorities should be more than rhetorical. They must be specific and quantified, so that they will influence the subsequent resource allocation decisions.

Constraints

There are two kinds of constraints - formal and informal. Formal constraints are upper or lower bounds on certain process variables, such as tax-rate increase, square feet of construction/yr., etc. Wherever possible these formal constraints should be specified in the policy report, prior to the evaluation of new plans.

Informal constraints are those loosely defined feelings about what is or is not feasible, mainly political limitations on possible courses of action. Planners often discover these constraints after plans have been developed; thus, an inventory of constraints develops over the years.

In general, while it is necessary to work within constraints, it is unwise to presume the infeasibility of certain proposals too readily. Politics is defined sometimes as the "art of the possible," but the effective politician makes his

own possibilities, rather than yielding to traditional, unchallenged notions about what can or cannot be done.

Design of Project Alternatives

Many school districts undertaking strategic planning for the first time believe that the battle is won when goals are agreed upon. In fact, goal-setting is only mid-way through the complete planning process.

One of the essential notions of systems analysis, of which PPB is a special case, is that it is possible to design alternative means to any set of goals and select rationally that alternative most likely to be effective and economical.

In STEP, once objectives (Indicator gaps) are agreed upon, several project design groups are created (or selected from existing groups), most containing staff, community, student memberships, to write proposals for achieving the objectives. Any proposed change in the operation of the school district is considered a "project"; projects may be additions to the district, deletions from the district (negative projects), or replacements (both a positive and negative proposal).

Project Proposals

STEP includes a project proposal activity, akin to (though less cumbersome than) the process of writing grant proposals. After the Board publicly announces its objectives (gaps that need to be closed), proposal development teams draft project designs. Project designs include the following elements:

- Expected impact on all Indicators
- Proposed activities (including schedule)
- Estimated costs over time

- Rationale (research or investigation which supports the belief that this proposal will produce the desired results in the specified time.

Proposals must cover all costs, activities and outcomes for the five-year period - with "0" entries for years in which the project is not in effect.

The developing of proposals is an important opportunity for community participation; it is quite important, however, that the project writing teams realize that not all proposals will be approved. For this reason, the project design requirements should be no more arduous than necessary.

Review of Project Proposals

All proposals are submitted to a Review Group. This group, four or five professionals, review the competency of the proposals - but do not act on them. The concern of the review group is to make sure that the cost estimates are accurate and complete, that the estimated effects are reasonable, and that the rationale is credible. The review group may require re-writes of certain proposals.

Again, the group do not approve proposals; merely ensures that the estimates of costs and effects are believable enough for the next stages in the planning process.

Re-iteration of Planning Model

Depending upon how many proposals are actually submitted, the planners next consider the implications of approving every possible combination of projects, or many possible combinations. Using the same planning model which converted assessment data to the "base case", project combinations are fed into the program and costs and outcomes are "added on" to the base case plan.

(In the case of negative projects, costs and outcomes may be removed from the base case.) This stage of the process is a simulation of the consequences of approving alternative plans of action. Each combination of projects generates a plan with as much detail as the "base case", including gaps that remain to be closed and indications of revenue feasibility. Sometimes this activity is known as the "What if..." stage; it is the essence of planning.

Selection of "Best Case"

The task of the planners is, now, to judge which of the possible alternatives (including the "base case") is the "best" course of action.

STEP allows this selection to be based on quantified criteria of desirability - in terms of both costs and desired outcomes.

Cost-Benefit Comparisons

Each alternative plan is characterized by a unique estimated cost and unique estimated set of outcomes. These outcomes are aggregated as a function of the priorities and size of remaining gaps associated with each alternate, so that each plan can be described as having a single benefit and single cost. (This process can be done informally, or formally, through any of several benefit estimating procedures, depending upon the willingness of the planners to make specific statements of personal value and utility.)

Alternative plans are arrayed, then, in ascending order of cost, as shown in Figure I-3.

(In the example shown, one alternative involves a large negative project, and, thus, is less costly than the base case.)

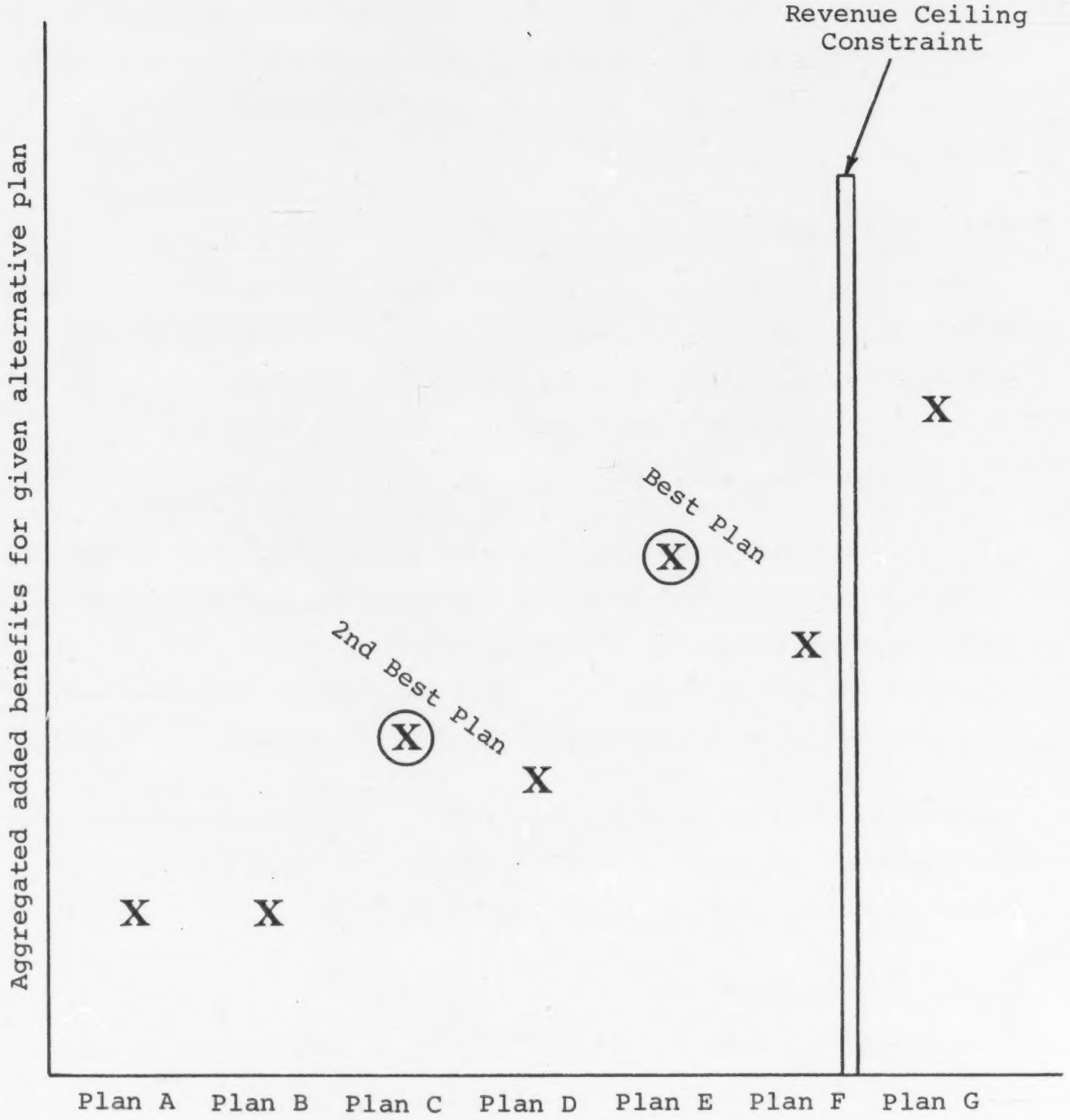

Figure I-3. Illustration of Cost-Benefit Comparison

In this illustration, any of the plans A-F are within the maximum feasible cost. Note, though, that Plan E, while less expensive than F, has a larger benefit prediction and, thus, is the "best" case. The second best alternative is Plan C.

Feasibility Evaluation

The best case, or recommended plan, is finally subject to feasibility review. This is a final check on a number of assumptions made earlier in the project. If, for some political, financial, or other reason the plan is unacceptable, the planners may return to their alternative cases and submit the "second best case" (see figure 3), and so forth.

In practice it may be necessary to reiterate parts of the process, by running new project combinations through the planning model, or by writing new designs and adding them to the alternative possiblities. As a last recourse, if no feasible plan is found, the decision-makers may consider a revision of policies, that is, a lowering of expectations or a loosening of process requirements.

In STEP, each economic saving is associated with an identifiable loss of effectiveness or quality. Thus, costs are related to outcomes, a relationship which does not occur in typical school budget evaluations.

Generating Year 1 Budget

Approval of the multi-year plan, is, in effect, an approval of the operating budget proposal for the next year - even though the detailed budget has not yet been written. In strategic planning, the decision point is moved back to the pre-preparation stage, and the actual budget preparation flows almost automatically from the approved plan.

In STEP, a plan is defined as the base case (or previous plan), plus some projects. Developing the operating budget, then, merely requires that the line-item version of the current year budget be modified by adding the line-item expenditures of the approved new projects for the first year of the plan (probably to be modified somewhat as a result of salary agreements not yet resolved during the planning period).

It is imperative that all persons in a position to approve or reject the proposed operating budget have already seen and accepted the program-budget in the multi-year plan.

Evaluation - Monitoring

In addition to the district-wide assessment, the projects added onto the educational programs are evaluated and monitored in some detail, to see that activities occur as planned, and whether expected outcomes do occur.

Project Control

Projects are more easily managed and controlled then the general programs. Unlike the broad programs, projects are not guaranteed perpetual life in the district; they can be scrutinized, modified, or even eliminated much more easily than the basic programs.

The purpose of project evaluation and monitoring is to assist the district in achieving its objectives, not merely to find fault.

Changes in Management Control

Over several years of planning, a larger and larger proportion of the activities of the district will be in these carefully designed and monitored projects, and, consequently, the management control of the district will be enhanced.

Projects generally have project directors, who, in turn, have management plans. Thus, the successes and failures of the district can be more accurately associated with specific staff members. This change will enhance the accountability of TPS to the community and enable the Board and Executives of the schools to better evaluate themselves and produce change and improvement.

And, further, the more projects are designed, installed, monitored, and evaluated, the better the planners and project design groups will become at devising and evaluating alternatives.

INTRODUCTION TO USER PROCEDURES

INTRODUCTION TO USER PROCEDURES

INTRODUCTION

At this point, we depart from the organization of the previous section - in which we considered each stage of the STEP planning process in sequence - and discuss some of the design features of the system that cut across several of the stages. This section is intended to add further clarification to the elements of the system, and to introduce some of the specific operations that will be performed by the users. The topics discussed below are:

STEP Program Structure

Program Descriptions

Project Design

Resource Forecasting

Revenue Forecasting

Volume II and III discuss two other elements in the system - goal-setting and enrollment forecasting.

STEP Program Structure

There are countless options for dividing a complex organization into its program structure. Among others, the Trenton Public Schools could organize its programs by type of funding used, geographical location of services provided, type of manpower employed, and others.

After consultation with administrators in the Trenton Public Schools, we have determined that there is a need for much greater detail in the instructional programs of the district - those programs which have a direct impact on students - than in the supportive or enabling programs of the district.

One way of thinking of the units in a program structure is in terms of cost centers, those clusters of activity that consume the individual investment packages of the district's funds - each with an anticipated return. Because most of the instructional programs of the district are site-specific - that is, the activities go on mainly in one geographical area - we have further decided to partition the instructional programs by location of school.

In the proposed STEP program structure, the cost center is a cluster of students, receiving a relatively uniform package of instructional services, usually in a given location. (Non-instructional programs are defined somewhat differently and will be discussed later.) Thus, the objectives for a given program, or sub-program, are to effect changes in the clients of that program; the evaluation of the program, or sub-program, is concerned mainly with the degree of success in effecting the desired changes. The most important aspects of a program description are, first, a description of the students in the program, and, second, a description of that group's performance on the district's Indicators of Quality.

Instructional Program Structure (Program Area I)

There are seven basic instructional programs in the district, differentiated by the age and/or type of student they serve. These seven are:

I.1 Early Childhood Instruction (Pre K-K)

I.2 Primary Instruction (Grade 1-3)

I.3	Elementary Instruction	(Grade 4-6)
I.4	Intermediate Instruction	(Grade 7-8)
I.5	Secondary Instruction	(Grade 9-12)
I.6	Special Instruction	(Handicapped Students, all grades)
I.7	Continuing Instruction	(Drop-outs, Graduates, Adults)

An analysis of district costs and effectiveness at even this summary level will prove quite instructive. The cost/student in each of these programs is different, as are the proportions of the district's total instructional expenditures in each program. Note, also, that even at this abstract level we can begin to see the expected output of each program; that is, the general objective for each of programs I.1-I.4 is to achieve a level of student competence that means he is ready or prepared for the next higher level. The objectives for I.5 - Secondary and I.7 - Continuing, relate to the kind of person who will enter the community as a result of public school services, especially with respect to his social and economic competence. Program I.6 - Special, of course, is harder to define, and will no doubt change frequently with the district's (or the State's) goals for education of the handicapped.

Partitioning Instructional Programs

The level of detail in this instructional program structure, while it allows for immediate improvement of the district's cost analysis, can be carried even further to improve planning and management. For that reason, each of the instructional programs may be further divided into its sites or schools. Note, however, that this school-by-school division is intended to focus on clusters of students who are taught together, rather than on the school itself as a cost center. Thus, at the sub-program level of detail for I.1-I.4, we have the following sub-program division:

I.1 Early Childhood Instruction

I.1.X (Early Childhood at School/Site X)

I.2 Primary Instruction

I.2.X (Primary Instruction at School/Site X)

I.3 Elementary Instruction

I.3.X (Elementary Instruction at School/Site X)

I.4 Intermediate Instruction

I.4.X (Intermediate Instruction at School/Site X)

This organization is not identical with the grade organization in all the schools. Most Elementary schools in the district consist of three sub-programs - an Early Childhood, Primary, and Elementary - and most Junior High Schools in the district consist of one sub-program - an Intermediate, but these divisions are not perfect. This organization is proposed because the goal of strategic cost-benefit analysis will be better served by treating students as cost centers, rather than buildings. (It will be possible, of course, to reassemble the program-budget accounts to correspond to schools, if that is what is required for some purposes.)

Another peculiarity is that the number of clients in each sub-program grows larger as the grades get higher. This imbalance is by design; the feeling among many TPS staff, and the general educational community, is that the consequences of early educational experiences are greater than those of later educational experiences. Thus, it is felt that much closer analysis and planning is required at the earlier levels - as a means to achieving goals at the higher levels. (Many academic failures at the secondary level are related to deficiencies that should have been overcome in primary grades.)

The product or output of levels I.1-I.4 are actually interim products, necessary milestones on the path to the terminal educational objectives. For that reason, the partitioning of students at the secondary level follows a different pattern. (Technically, not all secondary students are located in one site, since many are, or will be, educated in county vocational programs.) For these reasons, we propose that program I.5, Secondary Instruction, be further divided in the following way:

I.5 Secondary Instruction

I.5.1 College Preparatory Program

I.5.2 Vocational-Technical Program

I.5.3 Job Preparatory (Non Voc-Tech) Program

I.5.4 General and Unclassified Students Program

Note that, while each program is usually associated with a unique set of courses, this clustering is actually in terms of terminal student objectives; all students in Secondary Education can be classified as one of four types of students. (Because of technical problems, the STEP enrollment forecaster will only predict Voc-Tech and Non-Voc-Tech students.) The course offerings and staff associated with secondary education are means to achieving the ends envisioned by the programs. (Sub-program I.5.4 is, of course, a catch-all program, and efforts should be made to keep it as small as possible.) The managers of Secondary education may further divide these subprograms into subject-matters and courses, as may the managers of the earlier programs; these further classifications are of only limited utility in strategic planning, however.

Program I.6, Special Instruction, is partitioned as a function of the special handicaps of the students, then as a function of site/location. The proposed structure is.

I.6 Special Instruction

I.6.1 Handicap Type (Educable, Trainable, etc.)

I.6.1.X Handicap Type, at School/Site X

Program I.7, Continuing Instruction, is also partitioned by student goals. Its sub-programs are:

I.7 Continuing Instruction

I.7.1 Adult Basic Education

I.7.2 G.E.D.

I.7.3 General Continuing Instruction

Instructional Sub-Program Elements

Each sub-program can, of course, be further partitioned indefinitely. The level of detail presented so far may be the final level in the actual system. However, if it proves administratively feasible, it will be possible to further analyze each sub-program into elements. Each instructional sub-program can be partitioned into:

- instruction and teaching
- facilities, equipment, materials
- guidance and pupil services
- food services
- transportation services
- administration and supervision

Whether it is worth the additional effort required to achieve this level of detail, will be determined later.

Objects of Expenditure

The current budget format includes only the broad functional areas and the objects of expenditure; for this reason, there is a need for exhaustive detail in reporting the precise objects of expenditure. In program-budgeting, however, the program structure and program partitions are much more informative and relevant for decision-making purposes than the detailed objects of expenditure. For that reason, in the proposed program-budget format, very little detail on objects of expenditure is reported, namely:

Salaries

Direct Professional Salaries (Including Benefits)

Direct Non-Professional Salaries (Including Benefits)

Indirect Professional Salaries and Benefits (Accountable Overhead)

Indirect Non-Professional Salaries and Benefits (Accountable Overhead)

Indirect Professional Salaries and Benefits (Pro-rated Overhead)

Indirect Non-Professional Salaries and Benefits (Pro-rated Overhead)

Non-Salary Costs

Direct Equipment, Materials and Facilities

Indirect (Pro-Rated) Equipment, Materials, and Facilities

Capital Construction Costs (Debt Service)

Direct

Pro-Rated

Contracted Services

Direct

Indirect (Pro-Rated)

Total (all costs)

As we will show later, for certain decision-making purposes, only -

Salary

Non-Salary

Capital

Contracted Services

Total

will be presented. Again, the level of detail will be constrained by the amount of effort required.

To clarify some of the cost descriptors:

1. Direct expenditures are those costs which produce direct service to students - those people and things that are utilized in direct service to the clients.

2. Indirect accountable overhead refers to those supervisory and support costs which are consumed entirely by a program or sub-program.

3. Indirect pro-rated costs are those supervisory and supportive expenditures that are scattered among several programs or sub-programs, and assigned to them according to pro-rating fractions or percentages.

To illustrate, a vocational teacher is a direct cost. The Supervisor of Vocational Education is an indirect cost, directly accountable to the Vocational

sub-program. A counselor who divides his services among both Vocational and Non-Vocational students, however, is a cost that must be pro-rated, according to the fraction of his time spent in each group.

Note also that reports of salaries include the benefits now camoflagued in the 800 - Fixed Charges account. The separation of salary and benefit costs may serve certain administrative needs, but it obstructs the process of evaluating cost-effectiveness and planning for improvement.

Support Program Area (Area II)

Unlike many educational program accounting systems, the STEP program analysis endeavors to allocate as much of the indirect and central office expenditures of the district to instructional programs as possible. Nevertheless, many of TPS' expenditures are committed to support activities, programs that enable the district to achieve its instructional goals and satisfy its legal obligations to Trenton, The State, and the U.S. Office of Education. It is difficult, in most cases, to specify the output of these supportive services, but it is clear that when they are inadequately financed or operated, the district will be unable to meet its direct objectives and satisfy its legal requirements. Without as much detail as in the Instructional Program Area, the following program structure is proposed:

Support Programs (Area II)

II.1 Executive-Policy Program (Superintendent and Board of Education)

II.2 Central Public Information and Community Affairs

II.3 Central Curriculum Research and Development

II.4 Central Planning and Budget Development

II.5 Central Curriculum Supervision and Support

II.6 Central Pupil Personnel Services

II.7 Central Health-Dental-Child Study Services

II.8 Financial-Legal Services

II.9 Personnel-Payroll Services

II.10 Central Food Services

II.11 Central Transportation Services

II.12 Central Facilities-Maintenance-Operations

II.13 Central Capital Projects

Note that in several support programs, the word "central" underscores our intention to charge as many district expenditures as possible to instructional programs; those that remain, and cannot be realistically pro-rated, will be charged to support programs. (Thus, a custodial employee, permanently assigned to a given school, will be pro-rated across the instructional sub-programs in that school, not charged to program II.12. Similarly, a principal who spends a tenth of his time on a central office curriculum development project, will have a tenth of his costs charged to II.3.)

The object-of-expenditure breakdown for support programs will also be less detailed, including only:

Professional Salaries (and Benefits)

Non-Professional Salaries (and Benefits)

Non-Salary Costs

Contracted Services

Capital Outlay

Total Expenditures

PROGRAM (SUB-PROGRAM) DESCRIPTIONS

Instructional programs will be easier to describe - and more important for planning - than support programs. For that reason, two different kinds of program descriptions will be employed.

Instructional Program (or Sub-Program) Descriptions

Each instructional program description will contain the following classes of data:

a. Program Area, Program Name, and Code.

b. Brief narrative description of program aims and activities.

c. Number of students affected (by Belmont student type).

d. Staff, by type and number.

e. Current year approved expenditures by object classification (see previous section).

f. Expenditure/student, weighted (Bateman) and non-weighted

g. Revenue Sources - Federal, State, Local, Categorical and Non-Categorical.

h. Performance on District's Indicators of Quality for current and past year.

i. Cost-analyzer variables (see Resource Estimation, in this volume).

Support Program Descriptions

Each support program description will include:

a. Program Name, Code

b. Brief narrative description of activities and aims

c. Staff/type

d. Expenditures by object-class

e. Revenue sources

f. Performance Indicators - if appropriate

g. Cost-analyzer variables - if appropriate

PROJECT DESIGN

When TPS wishes to change its plan - that is, approve something other than the "base case," it specifies the desired performance changes (changes in levels on the Indicators) it wishes to accomplish, and initiates a project design phase.

Any substantial change in an existing program or project must be presented in a project design. The project design is a proposal, an idea developed for the Policy-Makers, which may or may not be approved. In assigning project design writing responsibilities the Policy-Makers may use any of the procedures now used for "letting out" bids for contracted services; there may be a general announcement, a selective announcement, or even a "sole source" request for proposal. The Policy-Makers may specify the group of students to be affected, or merely characterize the goal and let all groups "vie" for approval.

Any person or group proposing an innovation to the district presents a project design proposal. The proposal contains:

a. Those programs and sub-programs affected by the project.

b. The activities in the project.

c. The expected effects of the project on the Indicators.

d. A detailed analysis of the five-year costs of the project, broken down by the staff numbers and types needed, and other costs.

e. A defense or rationale citing reasons for believing the project will have the intended effects.

These proposals are submitted to a Review Group, 3 or 4 educational professionals who determine:

a. Whether they are complete.

b. Whether cost and effect forecasts are competent.

c. Whether the rationale is adequate.

The Review Group do not accept or reject project design proposals. They decide whether the data included is complete and reasonable and whether the proposal does not violate any federal, local, or state law; they have the option to revise the proposals, or send them back to the authors for revision.

The project design activity resembles, somewhat, New Jersey's Teacher Innovation Program ("mini-grant") proposal procedure, except that the scale of the projects can be much larger and the economic analysis is multi-year.

Note that there are "negative projects," that is, proposals to terminate activities and lower costs. A proposal to "cut" some of the school's program should be based on the same kind of analysis as a proposal to add something. Thus, no person can propose a cost reduction without building a plausible case for showing that it will have a positive, or at least non-negative, effect on the district's goals and objectives.

No project design, of course, may require the violation of any law, or the breach of any existing contractual obligations. Thus, the design activity will often

show the TPS what laws and contracts are most dysfunctional, and suggest legislative proposals as well.

Just as the district's goals and objectives reflect community sentiment, the project design teams should also include community representation. Community participants must understand, however, that not all proposals will be accepted.

RESOURCE FORECASTING

Among the more important activities in Year 2 will be completion of STEP's Resource Forecaster Component.

The estimation of resource requirements - the manpower, equipment, and other needs - of a program or sub-program can be achieved by a detailed analysis of all the costs that will be incurred. To a large extent, cost-estimating in the project design proposals is done this way. For larger units, however, such as instructional programs and sub-programs, it is more efficient to project costs with a computational model, a cost-analyzer. The rationale for this approach is that each program contains cost-consuming elements, and that these elements can be characterized as a set of relationships or ratios. In forecasting the resources required in an Elementary sub-program, for instance, it is enough to know the ratios of direct salary and non-salary expenditures to students, and the ratio of indirect-to-direct expenditures. These ratios can then be manipulated to show the effects of inflation and changing enrollments. The "base case" forecast of costs is produced essentially in this way.

These cost-analyzer ratios are usually the consequence of district policies - such as class size and salary agreements - and empirically determined factors, such as "teacher turnover" rates in the programs. In developing alternatives to the base case, the users may experiment with changing those policies, such

as causing the class size to change, or they may design specific projects that will change the ratios.

The resources required to support a given plan are determined, therefore, in one of two ways:

a. by changing the ratios assumed in the base case, or

b. by adding specific resource requirement estimates to those projected in the base case.

Both methods will be employed in STEP planning. The appropriate data on the cost-analyzer variables will be included in the program descriptions.

REVENUE FORECASTING

A peculiar problem in estimating revenues in STEP is caused by a new state subsidy program (the so-called Bateman program). Historical data on sources of revenue, therefore, is unreliable in forecasting future state aid. (This problem is compounded by uncertainties about the level of funding for the program that the Legislature will approve.)

Revenue forecasting in STEP will be used to match a given proposed plan to the revenues that will probably be available to support it. Each alternative plan will assume that all revenues other than locally produced money are predetermined, and the gap between cost and revenue will be presented as the local tax rate increase needed to support the plan.

An added advantage of STEP is that it will allow the district to forecast its state aid and local liability as a function of varying assumptions about its classification in Bateman classification scheme. Thus, for example, the system will calculate the differing revenue consequences associated with being either "Basic" or "Limited" in Year 3 of the plan.

Feasibility, in STEP, is a measure of the distance between the expected cost of a plan and the expected revenues. In the event that expected revenues are not enough to support even the "base case" plan, the system, unfortunately, may need to decide what and where to cut, with the smallest effect on the district's objectives.

ADMINISTRATION OF THE SYSTEM

STEP will not require a major re-organization of the district's administrative structure. It is appropriate, however, to point out some of the responsibilities that will be associated with strategic planning and recommend the assignment of these responsibilities to individuals and groups.

Responsibilities and Accountable Persons or Groups

1. Overall PPB supervision: The annual planning cycle will need close supervision and coordination by a Director of Planning; administrative responsibilities alone will require at least one-half a man-year.

2. Data Management and Processing: The substantial quantities of data and statistics, both educational and financial, will require the services of a Data Coordinator, probably assisted by 1 or 2 non-professional data gatherers.

3. Testing and Data Generation: The system will require that existing testing and evaluation activities be reorganized into a single program, under the direction of a specialist in tests, measures, and statistics; the annual community survey will also be under his direction.

4. Project Design Review Group: Three or four high level educators in the district will need to allocate about two weeks of their time to reviewing project design proposals.

5. Policy Determination: Policy decisions will, of course, be made by the Board of Education and Superintendent.

6. Program Management: In order that the district's plans may be implemented, each program and sub-program in the program structure will require a director or supervisor. This assignment will probably be allocated to existing staff, but may require the elevation of several teachers to a kind of "chairmen's" status in their sub-programs. In addition to supervising the program, the director will be responsible for collecting and transmitting program data to the Data Coordinator.

More detailed personnel assignments will be developed in Year 2. These initial proposals are intended to suggest future directions. It is quite possible that these assignments can be fulfilled by changing the duties of existing staff members.

EDUCATIONAL PLANNING-PROGRAMMING-BUDGETING SYSTEMS

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